



Fact Sheet

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EPA Study Finds Shelter-in-Place Guidelines Offer Protection During Chemical or Biological Attack or Accidental Release

The U.S. EPA's National Homeland Security Research Center (NHSRC) has conducted a comprehensive study that confirms the potential effectiveness of the U.S. Department of Homeland Security guidelines for residential safe havens to protect against a hazardous airborne release in the event of a terrorist attack or accident.

Background

The U.S. Department of Homeland Security (DHS) has recommended residential measures to use to protect against airborne contamination from a biological, chemical or radioactive release (see Figure 1). They include: (1) locking doors, and closing windows, air vents and fireplace dampers; (2) turning off fans, air conditioning and forced air heating systems; (3) going into an interior room with the fewest windows; and (4) sealing all windows, doors and air vents with plastic sheeting and duct tape. (These recommendations can be found at http://www.ready.gov/stay_or_go.html#stay).

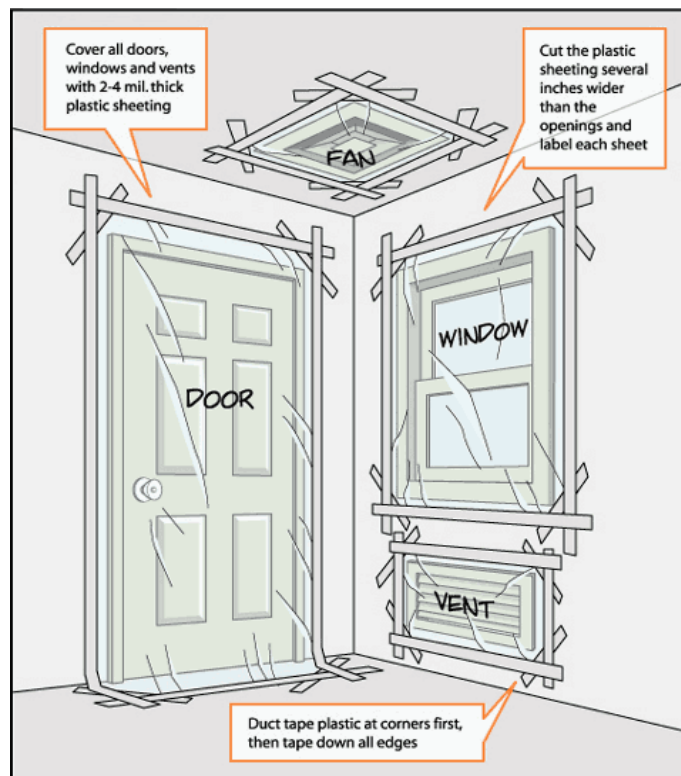


Figure 1: Seal-the-Room from www.ready.gov

To test the efficacy of these actions and determine protection levels, NHSRC researchers developed an improved method to determine the air flow rate for an in-house shelter and tested the DHS guidelines in a test house.

Results

Study results indicate that proper sealing can make a substantial difference in the effectiveness of the shelter, and is most beneficial if individuals enter the shelter before the arrival of a cloud of hazardous agent and exit the shelter as soon as the cloud passes over. The study provides useful information to emergency planners to evaluate their guidance to the public.

Results also indicate that most individuals can stay in the shelter for up to three hours before the air has the potential to become unhealthy. Individuals with respiratory problems may have less tolerance. Certain conditions that may result in unhealthy air include increased occupancy, a lower air flow rate, increased carbon dioxide emission rates, increased activity resulting in depletion of oxygen, or longer occupancy time.

The study was conducted to specifically evaluate shelter-in-place measures in residential houses. Further research is planned to evaluate the effectiveness of shelters for use in public buildings. The study is soon to be published in the *Journal of Hazardous Materials*.

For more information, visit the NHSRC at www.epa.gov/nhsrc.

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